LISTING OF THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Previously presented) A method of adhering a thermoplastic elastomeric composition to a solid substrate, comprising:

(a) dynamically vulcanizing a fluoroelastomer in the presence of a thermoplastic material and curing agent at a temperature above the melting point of the thermoplastic material for a time less than that needed to completely cure the fluoroelastomer, to form a partially cured thermoplastic vulcanizate;

(b) applying an adhesive layer to said substrate;

(c) bringing said partially cured thermoplastic vulcanizate into contact with said adhesive layer; and

(d) completing the curing of said thermoplastic vulcanizate.

2. (Original) A method according to Claim 1, wherein said bringing process element (c) comprises insertion molding said partially cured thermoplastic vulcanizate onto said adhesive covered substrate.

3. (Original) A method according to Claim 2, wherein said substrate is a metal.

4. (Original) A method according to Claim 1, wherein said substrate is a plastic.

5. (Original) A method according to Claim 4, wherein said bringing process element (c) comprises co-extruding said partially cured thermoplastic vulcanizate with said substrate.

6. (Original) A method according to Claim 5, wherein said applying process element (b) and said bringing process element (c) comprise co-extruding said adhesive layer, said partially cured thermoplastic vulcanizate, and said substrate.

7. (Original) A method according to Claim 6, wherein said adhesive layer is applied during said co-extrusion with a liquid continuous injection unit.

8. (Original) A method according to Claim 1, wherein said curing agent comprises a bisphenol.

9. (Original) A method according to Claim 1, wherein said curing agent comprises a peroxide.

10. (Previously presented) A method of making a composite article comprising:

(a) forming a partially cured thermoplastic elastomer composition by a process comprising mixing together a fluoroelastomer, a thermoplastic material, and a curing agent while heating at a temperature above the melting point of the thermoplastic material to effect partial curing of said fluoroelastomer in the presence of said thermoplastic.

(b) applying the partially cured thermoplastic elastomer composition onto a substrate; and

(c) curing said partially cured thermoplastic elastomer composition while it is in contact with the substrate.

11. (Previously presented) A method according to Claim 10, wherein step (a) is carried out in a continuous process.

12. (Original) A method according to Claim 10, wherein said fluoroelastomer is a copolymer of vinylidene fluoride.

13. (Previously presented) A method according to Claim 10, wherein step (a) is carried out for a time less than the T90 of the fluoroelastomer.

14. (Original) A method according to Claim 13, wherein said thermoplastic material comprises a fluoroplastic.

15. (Original) A method according to Claim 13, wherein said thermoplastic material comprises a non-fluorine containing thermoplastic.

16. (Original) A method according to Claim 13, wherein said thermoplastic material comprises a partially fluorinated thermoplastic.

17. (Original) A method according to Claim 13, wherein said curing agent comprises a bisphenol.

18. (Original) A method according to Claim 13, wherein said curing agent comprises a peroxide.

19. (Original) A method according to Claim 10, wherein said substrate comprises an adhesive layer on a solid support, and said partially cured composition is applied onto said adhesive layer.

20. (Previously presented) A method according to Claim 10, wherein said applying process element (b) comprises insertion molding said partially cured composition onto said substrate.

21. (Previously presented) A method according to Claim 10, wherein said applying process element (b) comprises co-extruding said partially cured composition and said substrate.

22. (Previously presented) A method of making a polymeric composite article, comprising:

(a) making a partially cured dynamic vulcanizate by a process comprising mixing together a fluoroelastomer resin, a thermoplastic polymeric material, and a curing agent that reacts with said fluoroelastomer resin while heating to a temperature above the melting point of the thermoplastic to cause reaction of said fluoroelastomer resin and curing agent, for a time corresponding to T90 or less of said fluoroelastomer;

(b) co-extruding said partially cured dynamic vulcanizate with a substrate; and

(c) completing the cure of said co-extruded partially cured dynamic vulcanizate.

23. (Original) A method according to Claim 22, wherein an adhesive layer is co-extruded between said partially cured dynamic vulcanizate and said substrate.

24. (Original) A method according to Claim 22, wherein a liquid adhesive is injected between said partially cured dynamic vulcanizate and said substrate during said co-extrusion process element (b).

25. (Previously presented) A method according to Claim 22, wherein the process of step (a) is carried out in a twin screw extruder.

26. (Original) A method according to Claim 25, wherein said fluoroelastomer resin comprises an uncured copolymer of monomer selected from the group consisting of hexafluoropropylene, vinylidene fluoride, tetrafluoroethylene, and mixtures thereof.

27. (Original) A method according to Claim 25, wherein said curing agent comprises a bisphenol.

28. (Original) A method according to Claim 25, wherein said curing agent comprises a peroxide.

29. (Previously presented) A method for making a composite article comprising a cured fluoroelastomer composition on a solid metal substrate using a mold, said method comprising:

(a) applying an adhesive layer onto said substrate;

(b) placing said adhesive covered substrate into said mold;

(c) making a partially cured elastomer by a process comprising mixing together a fluoroelastomer resin, a thermoplastic polymeric material, and a curing agent that reacts with said fluoroelastomer resin while heating above the melting temperature of the thermoplastic polymeric material to cause reaction of the resin and curing agent, wherein said resin is characterized by a curing time T90, and said curing reaction is carried out for a time less than T90;

(d) insertion molding the partially cured elastomer composition to contact said substrate in the mold; and

(e) completing the cure of said elastomer composition, while in contact with the substrate;

wherein said partially cured elastomer comprises a discrete phase comprising partially cured fluorocarbon elastomer and a continuous phase comprising a fluorine containing thermoplastic material.

30. (Previously presented) A method according to Claim 29, wherein the thermoplastic polymeric material is a fluoroplastic.

31. (Original) A method according to Claim 30, wherein said mixing is carried out in a twin-screw extruder.

32. (Original) A method according to Claim 30, wherein said fluoroelastomer resin comprises a copolymer of vinylidene fluoride, hexafluoropropylene, and tetrafluoroethylene.

33. (Original) A method according to Claim 30, wherein said curing agent comprises a bisphenol.

34. (Original) A method according to Claim 30, wherein said curing agent comprises a peroxide.

35. (Previously presented) A method for adhering a thermoplastic fluorocarbon elastomer composition onto a substrate using a twin screw extruder having a first port and a second downstream port, said method comprising:

(a) feeding a mixture of unmixed fluorocarbon elastomer and thermoplastic material said first port of said extruder, wherein the uncured elastomer is characterized by a time T90;

(b) feeding a curing agent for said fluorocarbon elastomer into said second port downstream of said first port;

(c) mixing said curing agent, fluorocarbon elastomer, and thermoplastic material in said extruder at a temperature above the melting point of the thermoplastic material for a time of T90 or less to make a partially cured thermoplastic vulcanizate of the fluorocarbon elastomer;

(d) extruding said partially cured thermoplastic vulcanizate from said extruder;

(e) applying said thermoplastic vulcanizate onto said substrate, and

(f) completing the cure of said thermoplastic vulcanizate on said substrate.

36. (Previously presented) A method according to Claim 35, wherein said applying process element (e) comprises insertion molding said partially cured thermoplastic vulcanizate into a mold containing said substrate.

37. (Original) A method according to Claim 35, comprising co-extruding said partially cured thermoplastic vulcanizate with said substrate.

38. (Original) A method according to Claim 35, wherein said fluorocarbon elastomer comprises a copolymer of vinylidene fluoride, hexafluoropropylene, and tetrafluoroethylene.

39. (Original) A method according to Claim 35, wherein said curing agent comprises a bisphenol.

40. (Original) A method according to Claim 35, wherein said curing agent comprises a peroxide.

41. (Original) A method according to Claim 35, wherein said thermoplastic material comprises a fluoroplastic.

42. (Original) A method according to Claim 35, wherein said thermoplastic material comprises a partially fluorinated fluoroplastic.

43. (Original) A method according to Claim 35, wherein said thermoplastic material comprises a non-fluorine containing thermoplastic.